

REMARKS

In the Office Action, the Examiner rejected claims 1, 3-5, 8, 12-15, 25, 26, 28, 32, and 33 under 35 U.S.C. § 102(a) based on the publication “Punctuation Annotation using Statistical Prosody Models,” Heidi Christensen et al. (referred to as “Christensen” herein); rejected claims 2, 6, 16, 20, and 27 under 35 U.S.C. § 103(a) based on Christensen; and rejected claims 7, 9-11, 17-19, 22-24, 29, 30, and 31 under 35 U.S.C. § 103(a) based on Christensen in view of the publication “A Practical Part-of-Speech Tagger,” Doug Cutting et al. (referred to as “Cutting” herein).

By this Amendment, Applicants amend claims 1, 4-6, 11, 12, 19, 21, 24, 25, 31, 32, and 33 to improve form and cancels claims 10, 18, 23, and 30 without prejudice or disclaimer. Support for certain of the amendments to the independent claims can be found at, for example, paragraphs 0038 through 0040.

As an initial matter, Applicants note that claim 21, although indicated as being rejected on the cover page of the Office Action, is not substantively addressed in the Office Action. Because claims 22-24, which depend from claim 21, were rejected under 35 U.S.C. § 103(a) based on Christensen and Cutting, Applicants will assume, for the purpose of this Office Action, that the Examiner also intended to reject claim 21 based on Christensen and Cutting. Clarification on the status of this claim is requested.

*Rejection Under 35 U.S.C. § 102(a)
Based on Christensen*

Claims 1, 3-5, 8, 12-15, 25, 26, 28, 32, and 33 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Christensen. Applicants respectfully traverse this rejection.

Amended claim 1 is directed to a linguistic segmentation tool that includes a lexical feature extraction component configured to receive text and generate lexical feature vectors relating to the text, the lexical feature vectors including words from the text and syntactic classes of the words, the lexical feature extraction component assigning syntactic classes from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language; an acoustic feature extraction component configured to receive an audio version of the text and generate acoustic feature vectors relating to the audio version of the text; and a statistical framework component configured to generate linguistic features associated with the text based on the acoustic feature vectors and the lexical feature vectors.

A proper rejection under 35 U.S.C. § 102 requires that a reference teach every aspect of the claimed invention. See M.P.E.P. § 2131. Christensen does not disclose or suggest the combination of features recited in claim 1.

For example, Christensen does not disclose or suggest the lexical feature extraction component recited in claim 1, which is configured to receive text and generate lexical feature vectors relating to the text, the lexical feature vectors including words from the text and syntactic classes of the words, the lexical feature extraction component assigning syntactic classes from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language. In rejecting claim 1, the Examiner relies on portions of Section 1.1 and 2.2 of Christensen to allegedly disclose the lexical feature extraction component recited in claim 1.

Christensen is directed to the use of prosodic and linguistic features in speech to identify punctuation marks such as the full stop, the comma, and the question mark. (Christensen, section

1). Prosody is described by Christensen as including information such as pitch, speech unit durations, and pauses. (See Christensen, sections 1.1 and 2.1). Although Christensen generally discloses that linguistic information may also be used in the automatic punctuation generation system of Christensen, this linguistic information appears to refer to the sequence of words corresponding to the audio information. (See Christensen, section 2.2). More specifically, Christensen states, in section 2.2: “We formulate the problem of identifying punctuation marks as that of identifying the last word before a punctuation mark, given a sequence of words and prosodic features.” (Christensen, second paragraph, section 2.2) (emphasis added). Neither the prosodic information nor the linguistic features (i.e., the sequence of words) described by Christensen, however, can reasonably be said to correspond to the syntactic classes recited in claim 1. Christensen, therefore, does not disclose or suggest the lexical feature extraction component recited in claim 1, which generates lexical feature vectors that include words and syntactic classes of the words.

Additionally, Applicants note that claim 1 now recites that the lexical feature extraction component assigns syntactic classes from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language. Christensen also fails to disclose or suggest this aspect of claim 1.

A feature similar to that now recited in claim 1, in which the lexical feature extraction component assigns syntactic classes from a set of classes including classes for particular word affixes, was previously recited in claim 10, which is now cancelled. In rejecting claim 10, the Examiner additionally relies on Cutting. To the extent that the Examiner may consider the previous

rejection of claim 10 under 35 U.S.C. § 103(a) based on Christensen and Cutting to apply to amended claim 1, Applicants respectfully traverse.

Cutting, as the Examiner notes, is directed to a part-of-speech tagger that assigns parts of speech to words. In section 2.2 of Cutting, Cutting discusses using Hidden Markov Models (HMMs) to implement the part-of-speech tagger. In rejecting the features previously recited in claim 10, the Examiner appears to rely on the disclosure in Cutting of: “Vocabulary independence is achieved by predicting categories for words not in the lexicon, using both context and suffix information.” (Cutting, Section 2.2). This section of Cutting describes categories that may be input to the HMM to generate the part-of-speech tags.

Applicants submit that one of ordinary skill in the art, reading Christensen and Cutting, would not be motivated to combine Christensen and Cutting, as the Examiner appears to suggest, to obtain the lexical feature extraction component recited in amended claim 1. Cutting discloses that “automatic text tagging is an important first step in discovering the linguistic structure of large text corpora.” (Cutting, Section 1). Cutting further discloses that applications for tagging include: “phrase recognition, word sense disambiguation, and grammatical function assignment.” (Cutting, Abstract).

In other words, Cutting explicitly discloses that the part-of-speech tags generated using the techniques described by Cutting can be used as an input to other automated linguistic discovery systems. Accordingly, one of ordinary skill in the art, reading Christensen and Cutting, would, if anything, use the part-of-speech tags generated by the system of Cutting as an input to the punctuation annotation system of Christensen. Part-of-speech tags do not reasonably correspond to, as recited in claim 1, syntactic classes from a set of classes including classes for particular word

affixes. Thus, if anything, Cutting appears to teaches away from combining these references in the manner suggested by the Examiner.

Amended claim 1 additionally recites that the set of classes include classes for particular word affixes generated automatically from a corpus of text documents in a given language. Christensen and Cutting, either alone or in combination, also fail to disclose or suggest this feature of claim 1. Cutting, for instance, in contrast to this feature of claim 1, discloses training HMM models using training text that appears to include part-of-speech tags (e.g., human-annotated part-of-speech tags). In stark contrast, claim 1 recites that classes for particular word affixes are generated automatically from a corpus of text documents in a given language.

For at least this reason, Applicants submit that Christensen does not disclose or suggest each of the features recited in claim 1 and the rejection of this claim should therefore be withdrawn. Further, one of ordinary skill in the art would not combine Christen and Cutting to obtain the features recited in claim 1 and claim 1 should therefore be allowable over a combination of Christensen and Cutting.

The rejection of claims 3-5 and 8 under 35 U.S.C. § 102(a) should also be withdrawn, at least by virtue of the dependency of these claims from claim 1.

Independent claim 12 also stands rejected under 35 U.S.C. § 102(a) based on Christensen. Applicants respectfully traverse the rejection of this claim.

Claim 12 is directed to a method for determining linguistic information for words corresponding to a transcribed version of an audio input stream including speech. The method of claim 12 includes generating lexical features for the words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including

classes for particular word affixes generated automatically from a corpus of text documents in a given language; generating acoustic features for the audio input stream, the acoustic features being based on at least one of speaker pauses, speaker rate, speaker energy, and speaker pitch; and generating the linguistic information based on the lexical features and the acoustic features.

Christensen does not disclose or suggest the combination of features recited in claim 12. For example, Christensen does not disclose or suggest generating lexical features for words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language. As described above in the arguments for claim 1, Christensen does not disclose or suggest the use of a syntactic class. Further, Christensen clearly does not disclose or suggest a syntactic class selected from a set of classes including classes for particular word affixes.

A feature similar to that now recited in claim 12 was previously recited in claim 18, which is now cancelled. In rejecting claim 18, the Examiner additionally relies on Cutting. To the extent that the Examiner may consider the previous rejection of claim 18 under 35 U.S.C. § 103(a) based on Christensen and Cutting to apply to amended claim 12, Applicants respectfully traverse.

As previously discussed, Section 2.2 of Cutting describes categories that may be input to an HMM to generate part-of-speech tags. Applicants submit that one of ordinary skill in the art, reading Christensen and Cutting, would not be motivated to combine Christensen and Cutting, as the Examiner appears to suggest, to obtain, generating lexical features for words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes. If anything, Cutting appears to teach away from the combination suggested by the Examiner, as one of ordinary skill in the art would likely use

the part-of-speech tags generated by the system of Cutting as an input to the punctuation annotation system of Christensen. Part-of-speech tags do not reasonably correspond to, as recited in amended claim 12, a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes.

Further, as discussed previously, Cutting discloses training HMM models using training text that includes pre-generated part-of-speech tags (e.g., human-annotated part-of-speech tags). In stark contrast, claim 12 recites that classes for particular word affixes are generated automatically from a corpus of text documents in a given language.

For at least this reason, Applicants submit that Christensen does not disclose or suggest each of the features recited in claim 12 and the rejection of this claim should therefore be withdrawn. Further, one of ordinary skill in the art would not combine Christensen and Cutting to obtain the features recited in claim 12 and claim 12 should therefore not be rejected as obvious in view of Christensen and Cutting.

The rejection of claims 13-15 under 35 U.S.C. § 102(a) should also be withdrawn, at least by virtue of the dependency of this claim from claim 12.

Independent claim 25 also stands rejected under 35 U.S.C. § 102(a) based on Christensen. Claim 25, as amended, includes features similar to those recited in claim 1. Claim 25, in particular, recites building a language model based on lexical feature vectors extracted from the document, the lexical feature vectors including words and syntactic classifications of the words, the syntactic classifications being selected from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language.

Accordingly, based on rationale similar to that discussed above with respect to claim 1, Applicants submit that the rejection of claim 25 based on Christensen is improper and should be withdrawn. The rejection of claims 26 and 28 under 35 U.S.C. § 102(a) should also be withdrawn, at least by virtue of the dependency of this claim from claim 25.

Independent claims 32 and 33 also stand rejected under 35 U.S.C. § 102(a) based on Christensen. Claims 32 and 33, as amended, includes features similar to those recited in claim 12. Accordingly, based on rationale similar to that discussed above with respect to claim 12, Applicants submit that the rejection of claims 32 and 33 based on Christensen is improper and should be withdrawn.

*Rejection Under 35 U.S.C. § 103(a)
Based on Christensen*

Claims 2, 6, 16, 20 and 27 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious in view of Christensen. Applicants submit that at least in view of the dependency of these claims from claims 1, 12, or 25, either directly or indirectly, the rejection of these claims is improper and should be withdrawn.

Additionally, claims 2, 6, 16, 20 and 27 recite additional features that are not disclosed or suggested by Christensen. Claim 2, for example, the linguistic features include periods, quotation marks, exclamation marks, commas, and phrasal boundaries. Christensen does not disclose or suggest this aspect of claim 2. Christensen, for instance, appears to only identify punctuation marks such as the full stop, the comma, and the question mark. (Christensen, section 1.) Christensen, does not disclose or suggest identifying phrasal boundaries as a linguistic feature. A “phrasal boundary,”

as used in the instant application, includes boundaries defined by non-visible information. (See, for example, paragraph 0006 of the as-filed specification.)

For at least this reason also, Applicants submit that Christensen does not disclose or suggest the features of claim 2. Claims 20 and 27 recite features similar to those recited in claim 2, and therefore, based on similar rationale, Applicants submit that Christensen also does not disclose or suggest the features of these claims.

*Rejection Under 35 U.S.C. § 103(a)
Based on Christensen and Cutting*

Claims 7, 9, 11, 17, 19, 21, 22, 24, 29, and 31 stand rejected under 35 U.S.C. § 103(a) based on Christensen and Cutting. Applicants respectfully traverse this rejection.

Claims 7, 9-11, 17, 19, 29, and 30 depend from one of claims 1, 12, and 25, either directly or indirectly. At least by virtue of this dependency, Applicants submit that the rejections of these claims are improper and should be withdrawn. Claims 7, 9-11, 17, 19, 29, and 30 recite additional features that are not disclosed or suggested by Christensen and Cutting, either alone or in combination.

Claim 11, for example, which depends from claims 1 and 9, recites that the set of classes additionally include syntactic classes based on frequently occurring words. Neither Christensen nor Cutting disclose this feature. The Examiner, at page 9 of the Office Action, appears to contend that Section 2.1 of Cutting is relevant to this feature. Specifically, the Examiner states: “the tags are determined based on models, the models created from probabilities, or frequencies, of each word in a training corpus.” (Office Action, page 9). Without commenting on the accuracy of the Examiner’s

summary of Cutting, Applicants submit that the Examiner has not addressed the features recited in claim 11.

Simply because the part-of-speech tags disclosed by Cutting may be based on a model that uses probabilities, as apparently contended by the Examiner, does not disclose or suggest that the set of classes additionally include syntactic classes based on frequently occurring words. Although it may be true that a frequently occurring word may tend to have a higher probability of occurrence than a less frequently occurring word, this in no way discloses or suggests syntactic classes defined based on frequently occurring words, as recited in claim 11.

For at least this reason also, the rejection of claim 11 based on Christensen and Cutting is improper and should be withdrawn. Dependent claims 19, 24, and 31 recite features similar to those recited in claim 11. Accordingly, based on rationale similar to that given for claim 11, Applicants submit that rejection of these claims is also improper and should be withdrawn.

Independent claim 21 and its dependent claims 22 and 24 are also patentable over Christensen and Cutting, whether taken alone or in combination.

Claim 21 is directed to a computing device for determining linguistic information for words corresponding to a transcribed version of an audio input stream that includes speech. The computing device includes a processor and a computer memory coupled to the processor and containing programming instructions that, when executed by the processor, cause the processor to generate lexical features for the words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes generated automatically from a corpus of text documents in a given language. Additionally, the processor generates acoustic features for the audio input stream, the acoustic features being

based on at least one of speaker pauses, speaker rate, speaker energy, and speaker pitch; generates the linguistic information based on the lexical features and the acoustic features; and outputs the generated linguistic information as meta-information embedded in the transcribed version of the audio input stream.

Christensen and Cutting, either alone or in combination, do not disclose or suggest the combination of features recited in claim 21. For example, these references do not disclose or suggest the generation of lexical features for words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes. As described above in the arguments for claim 1, Christensen does not disclose or suggest the use of a syntactic class. Further, Christensen clearly does not disclose or suggest a syntactic class selected from a set of classes including classes for particular word affixes.

Cutting does not cure this deficiency of Christensen. As previously discussed, Cutting describes categories that may be input to an HMM to generate part-of-speech tags. Applicants submit that one of ordinary skill in the art, reading Christensen and Cutting, would not be motivated to combine Christensen and Cutting, to generate lexical features for words, including a syntactic class associated with at least one of the words, the syntactic class being selected from a set of classes including classes for particular word affixes. If anything, one of ordinary skill in the art combining Christensen and Cutting would likely use the part-of-speech tags generated by the system of Cutting as an input to the punctuation annotation system of Christensen. Part-of-speech tags do not reasonably correspond to, as recited in claim 21, a syntactic class being selected from a set of classes including classes for particular word affixes.

For at least these reasons, Applicants submit that the combination of Christensen and Cutting does not disclose each of the features of claim 21. At least by virtue of their dependency from claim 21, Applicants submit that the rejection of claims 22 and 24 under 35 U.S.C. § 103(a) should also be withdrawn.

Claims 22 and 24 recite additional features that are not disclosed or suggested by Christensen and Cutting, either alone or in combination. Claim 24, for example, recites that the syntactic class is further selected from a set of classes including classes defined based on word frequency. Based on rationale similar to that given for claim 11, Applicants submit that rejection of the claim 24 is also improper and should be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully requests the Examiner's reconsideration of the application and the timely allowance of the pending claims.

As Applicants' remarks with respect to the Examiner's rejections overcome the rejections, Applicants' silence as to certain assertions by the Examiner in the Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, etc.) is not a concession by Applicants that such assertions are accurate or that such requirements have been met, and Applicants reserve the right to dispute these assertions/requirements in the future.

If the Examiner believes that the application is not now in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned to discuss any outstanding issues.

Application No. 10/610,696
Amendment dated June 27, 2007
Reply to Office Action of February 27, 2007

Docket No.: BBNT-P01-192

Applicants believe no fee is due with this response other than as reflected on the enclosed Amendment Transmittal. However, if a fee is due, please charge our Deposit Account No. 18-1945, under Order No. BBNT-P01-192 from which the undersigned is authorized to draw.

Dated: June 27, 2007

Respectfully submitted,

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